

Notice of Allowability

Application No.

10/785,054

Examiner

Thomas L. Dickey

Applicant(s)

SONG ET AL.

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to Response after Ex Parte Quayle Action filed 02-07/06.
2. ☒ The allowed claim(s) is/are 1,3-5,10 and 12-16.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Art Unit: 2826

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance:

Claims 1, 3-5, 10, and 12-16 are allowed over the references of record because none of these references disclosed or can be combined to yield the claimed invention such as a semiconductor laser, comprising a substrate etched into a mesa structure; an active layer formed on the mesa structure and being a core of a waveguide; a first clad layer formed on the active layer; a current blocking layer formed on the etched substrate in both sides of the mesa structure; an etch-stop layer formed on the first clad layer and the current blocking layer; a second clad layer formed on the etch-stop layer being located on an upper portion of the mesa structure with a predetermined width; an ohmic contact layer formed on the second clad layer; a first electrode contacted with the ohmic contact layer; and a second electrode formed on the bottom of the substrate, wherein the current blocking layer is (applicant's claims, as of 12/18/05, recite, "may be," however the intended meaning appears to be "is") formed by a first p type, an n type, and a second p type semiconductor layers, as recited in claims 1, 10 and 14.

For example, KISH ET AL. 2005/0151144 discloses a semiconductor laser, comprising a substrate 12-13-14A etched into a mesa structure 28A; an active layer 16 formed on the mesa structure 28A and being a core of a waveguide 10N; a first clad layer 18A formed on the active layer 16; a current blocking layer 77 formed on the etched sub-

Art Unit: 2826

strate 12-13-14A in both sides of the mesa structure 28A; an etch-stop layer 70-72 formed on the first clad layer 18A (part 70 is the part of etch stop layer 70-72 on first clad layer 18A) and the current blocking layer 77 (part 72 is the part of etch stop layer 70-72 on current blocking layer 77); a second clad layer 74 formed on the etch-stop layer 70-72 being located on an upper portion of the mesa structure 28A with a predetermined width; an ohmic contact layer 76 formed on the second clad layer 74; a first electrode 22 (seen in figure 1) contacted with the ohmic contact layer 76; a second electrode 26 (seen in figure 1) formed on the bottom of the substrate 12-13-14A. Kish et al. further discloses that the current blocking layer may be formed by a first p type semiconductor layer. But Kish et al. neither discloses nor suggests a current blocking layer formed by a first p type, an n type, and a second p type semiconductor layers, as recited in claims 1, 10, and 14.

For another example, MORI ET AL. 5,311,534 discloses a semiconductor laser, comprising a substrate 506; an active layer 501 formed directly on the substrate 506 and being a core of a waveguide; a first clad layer 504 formed on the active layer 501; a current blocking layer 507 formed from a first p type, an n type, and a second p type semiconductor layers, on the etched substrate 506 in both sides of the mesa structure; an etch-stop layer 503; a second clad layer 508 formed on the etch-stop layer 503 being located on an upper portion of the mesa structure with a predetermined width; an ohmic contact layer 509 formed on the second clad layer 508; a first electrode 510 contacted

Art Unit: 2826

with the ohmic contact layer 509; and a second electrode 511 formed on the bottom of the substrate 506. However, Mori et al's etch-stop layer 503 is not formed on first clad layer 504 and current blocking layer 507, and a fundamental purpose of Mori et al's invention would no longer be served were etch-stop layer 503 to be moved so that it lay on first clad layer 504 and current blocking layer 507.

Ashida 5,949,809 provides further insight into the differences between the claimed semiconductor laser and semiconductor lasers disclosed in the prior art. Ashida discloses a semiconductor laser, comprising a substrate 1-2; an active layer 3 formed directly on the substrate 1-2 and being a core of a waveguide; a first clad layer 4a formed on the active layer 3; a current blocking layer 6 formed by a first p type 6a, an n type 7, and a second p type 6b semiconductor layers, a second clad layer 4b formed on the etch-stop layer being located on an upper portion of the mesa structure with a predetermined width; and an ohmic contact layer 9 formed on the second clad layer 4b. In the embodiment of figure 1 Ashida discloses an etch-stop layer 8 formed on the first clad layer 4a and the current blocking layer 6, and in the embodiment of figure 3 Ashida discloses that the second clad layer 4b is formed on a mesa structure with a predetermined width. But Ashida neither discloses nor suggests that the substrate is etched into a mesa structure or that the current blocking layer is formed on the etched substrate in both sides of said mesa structure.

Art Unit: 2826

Ultimately, it is the incorporation of a current blocking layer, formed by a first p type, an n type, and a second p type semiconductor layers, into a semiconductor laser, having an etch-stop layer formed on a first clad layer as well as being formed on said p-n-p current blocking layer that in turn is formed on both sides of a mesa structure etched from substrate, that renders the claimed invention novel and non-obvious.

2. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

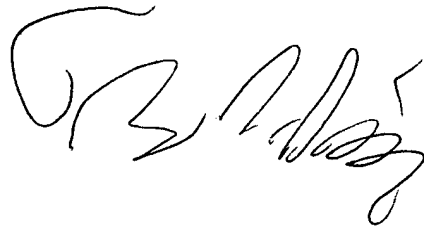
3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published appli-

Art Unit: 2826

cations may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'T. L. Dickey', is positioned above the printed name.

Thomas L. Dickey
Patent Examiner
Art Unit 2826
02/06